LAB 85 VERTICAL

UPRIGHT LOW/ULTRA LOW FREEZERS

PRIME AND MERIT SERIES

-40ºC

GA/AA/DA 039 P/M GA/AA/DA 050 P/M
GA/AA/DA 061 P/M GA/AA/DA 073 P/M

-86ºC

GV/AV/DV 039 P /M GV/AV/DV/050 P/M
GV/AV/DV/061 P/M GV/AV/DV/073 P/M

User Manual

Note：**ELCOLD reserves the right to modify any parts of this manual without prior notice.**

- No part of this manual may be reproduced in any form, or translated into other languages, without the expressed written permission of Elcold.
- Contact Elcold if any points in this manual are not clear.

Dear Customer.

Thank you for choosing our product. You have purchased one of the finest, state of the art, ultra low freezers available.

Our freezers tolerate voltage fluctuations, high ambient temperatures, heavy traffic in and out of the freezer, and are designed to perform in demanding environments.

Both low and high cascade compressors feature a high compression rate, low noise and vibration, ensuring ultra quiet running. (Below 57 dBa). The compressors high efficiency: horsepower ratio provides the maximum gas displacement / hp, ensuring maximum refrigeration efficiency at low energy consumption. Our compressors are industrial grade units which, like the refrigerants, are available all over the world, reducing your dependency on proprietary products, reducing your maintenance costs.
Our freezers comply with CE and UL safety and performance standards and only CFC/HCFC-free refrigerants are used.
Our freezers are backed by a full range of accessories and inventory systems to suit all your requirements.

Contents

1. General Safety Precautions 1
2. Safety 3
    2.1 Environmental Conditions 3
    2.2 Initial Loading 3
3. Unpacking 4
4. Installation 4
    4.1 Positioning 4
    4.2 Leveling 4
    4.3 Cleaning 5
    4.4 Electrical Connections 5
5 Operation 5
    5.1 Opening the Door 5
    5.2 Closing the Door 6
    5.3 Temperature Recorder (Optional) 6
6. Operation 8
    6.1 Prime Series Control Panel 8
    6.2 Merit Series Control Panel 13
    6.3 Start Up 15
7. Maintenance 17
    7.1 Rechargeable Battery 17
    7.2 Condenser Maintenance 18
    7.3 Gasket Maintenance 18
    7.4 Defrosting 18
    7.5 Cleaning 19
8. Troubleshooting 20
9. Appendices 21
    Alarm Error Codes 21
    Power Consumption/ Heat Generation 22
    LCO_2 Backup System 23

1. General Safety Precautions

This manual contains important safety advice and should be read before operating the freezer to prevent possible injury.

Precautions are illustrated in the following way:

> ⚠ **WARNING/CAUTION**
>
> Failure to observe WARNING signs could result in a hazard to personnel, possibly resulting in serious injury.
> Failure to observe CAUTION signs could result in injury to personnel and damage to the product and property.

Please keep this manual in a place accessible to users of this product.

Electrical Housing Label

This label is found on the box cover housing high voltage electrical components.
The cover should only be removed by a qualified engineer, or service personnel.

- **Use this product only in the way described in the product literature and the manual.**
- **Do not modify system components. Before use, check that the product has not been altered in any way.**
- **Your unit must be properly grounded in compliance with local electrical conventions.**
- **Do not use the unit outdoors.**
- **Only qualified engineers or service personnel should install the unit.**
- **Install the unit on a sturdy, level floor.**
- **Do not install the unit in a humid place or a place where is likely to be splashed by water. The units should be installed in a dry, well ventilated place.**

- **Do not install the unit in a flammable or volatile location.**
- **Do not install the unit where acid or corrosive gases are present.**
- **Do not store volatile, flammable or corrosive substances inside the unit.**
- **Disconnect the power source to the unit prior to any repair or maintenance.**
- **Do disassemble, repair, or modify the unit yourself.**
- **Ensure that the unit is standing straight and is not touching other equipment. Ensure that there is good air circulation around the unit. This is essential for proper performance of the unit. A space of 70mm should surround the unit on all sides.**

- **Connect the unit to a power source as printed on the data plate located on the lower right side of the unit.**
- **When removing the plug from the power supply outlet, grip the power supply plug, not the cord. Disconnect the power plug before moving the unit.**
- **Do not damage or break the power supply plug or cord.**
- **Wear gloves when you remove frozen items from the freezer.**
- **Disconnect the power plug when the unit is not used for a long time.**
- **Do not tilt the unit while moving it.**
- **Do not make holes in the cabinet walls to install attachments.**
- **Do not defrost the inside walls with a knife or any sharp object.**

2. Safety

The refrigeration system is designed to maintain ultra-low temperatures in +32°C ambient environments.

This unit is not a "rapid-freeze" device. Freezing large quantities or liquid, or high-water content items will raise the chamber temperature and will cause the compressors to operate for a prolonged period of time. Improper use of the freezer may jeopardize safety or cause damage to the compressors.

Avoid opening the door for extended time periods.

2.1 Environmental Conditions

This equipment is designed to operate in the following conditions:

- Indoor use;
- Ambient temperature between +15°C and +32°C;
- Main supply voltage fluctuation not to exceed +**10% to -10%** of normal voltage.

2.2 Init. Loading (NOT valid for freezers working at -86 deg incl AVO5OM)

When loading the unit with pre-frozen materials, the operating temperature set point should not be set lower than the temperature of the pre-frozen material. Allow the unit to operate at the set point for eight hours. The set point may then be lowered in increments no greater than 10°C. Allow a stabilizing period of eight hours for **every ten degrees**, until the desired set point is achieved.
Failure to follow these procedures, or overloading the unit, may cause excessive stress on the compressors and jeopardize user safety.

3. Unpacking

On delivery, unpack the unit and check for damage. Should there be any damage, immediately contact the delivery service or relevant sales outlet.
Do not operate a unit that has been damaged during transport.

4. Installation

Do not deviate from the electric and temperature ratings printed on the data plate located on the rear, lower right side of the unit.

Incorrect installation & operation of the equipment may result in potentially hazardous conditions. To avoid hazards and minimize risk, follow all instructions and operate the unit within the limits stated on the data plate.

4.1 Positioning

The unit must be placed in a dry well ventilated place away from direct sunlight and sources of heat.

Install the unit on a vibration free, level floor, with a **minimum** of fifteen centimeters of space on the sides, rear, and top. Allow sufficient clearance for the door to open at least 90 degrees.

The ambient temperature range should be between +15°C to +32^{o}C.

4.2 Leveling

The unit must be level: Both front to back and side to side.

The unit has adjustable leveling feet located adjacent to the front casters. Extend the leveling feet by rotating them counterclockwise.

Remove the plastic protective sheets from the interior cabinet walls and shelves before operating the unit.

4.3 Cleaning

Clean or disinfect the unit inside and outside before use. Do not use aggressive cleaning agents, abrasive detergents, steel wool, abrasive sponges or chemical solvents. When cleaning, make sure that no fluids of any kind run into the ventilator housing.

Disinfectants are used in concentrations usual for the customer in one-or four-hour values. For disinfecting small areas, a concentrated alcoholic agent is recommended.

4.4 Electrical Connections

Connect the unit to the correct power source. Incorrect voltage can result in damage to the freezer.

For personal safety and trouble-free operation, the unit must be properly grounded. Failure to ground the freezer may cause personal injury, or damage to the unit. If the power supply outlet is not grounded, it is necessary to install a ground from the ground screw located on the lower right rear side of the unit.

Plug the supplied power line to the freezer and to a dedicated mains supply. Supply voltage must be within **+10% to -10%** of the freezer's rated voltage.

Never cut, or remove the grounding prong from the service cord plug. If the prong is removed, the freezer will not be properly grounded.

5 Operation

5.1 Opening the Door

- Grasp the latch handle, and pull it firmly towards to you until the latch disengages from the track.
- Keep pulling on the latch handle to open the main door.

5.2 Closing the Door

<u>Note that the latch does not automatically self-engage when you close the door</u>.

Ensure that the latch is in the open position.

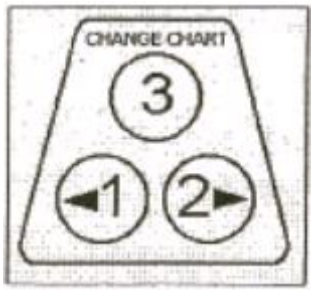
- Push the door to the closed position and, in one continuous movement gently push the handle away from you, making sure that the latch engages fully with the track.

Closing the door without ensuring that the latch is fully engaged with the track could result in damage to the door.

5.3 Temperature Recorder (Optional)

If your unit has been fitted with a temperature recorder, please read the following.

-Pen arm calibration



Press and hold the change chart button (3) until the pen begins to move off the chart. Once the pen has moved off the chart, again press and hold the change chart button (3) until the pen begins to move back onto the chart. Then pen should briefly stop at the outer most temperature graduation of the chart before continuing onto the chart to begin recording. If the pen does not stop exactly at this location on the chart, it can be adjusted or calibrated by using the left (1) or right (2) arrow buttons.

-Chart range selection

After the recorder has been turned-on and is operating normally (recording temperature), press and hold the change chart button (3) until the pen arm begins to move off the chart. Once the pen has moved off the chart, press and hold the left (1) or right (2) arrow button for approximately five seconds and then release the button.

The green LED light will flash one time if range 1 is selected, or will flash twice if range 2 is selected, and so on.

Press the left arrow button (1) to increase the range number or press the right arrow button (2) to decrease the range number that is selected for the recorder. When you have finished selecting the range, press and hold the change chart button (3) until the pen begins to move back onto the chart. The selected range will be saved into the recorder’s permanent memory.

6. Operation

6.1 Prime Series Control Panel

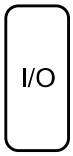
Figure 1. Prime Series Control Panel

A. I/O indicator
B. I/O key
C. Alarm indicator
D. Alarm mute
E. Alarm test
F. Temperature failure indicator
G. Door open
H. Compressor protection indicator
I. Ambient temperature indicator
J. Heat exhaust indicator
K. Clean filter indicator
L. Power failure indicator
M. Fuse indicator
N. Voltage failure indicator
O. Low alarm battery indicator
P. LCO_2/LN_2 backup system
Q. Function keys

Before using the freezer, familiarize yourself with the freezer controls.

6.1.1 Control Keys

6.1.1.1 On /Off



Press to start or to stop the unit. The indicator lights when the freezer is in on.
Enter password in the following ssequence △▽◁▷ **(Up, Down, Left, Right).**
The freezer will start. The firmware version will be displayed.

6.1.1.2 Alarm Mute

Press to mute the alarm. The alarm indicator will light when mute is active.
The alarm will sound again after each 5 minute period.

6.1.1.3 Alarm Test

Press to test the alarm. The alarm will sound when pressed.

6.1.1.4 Alarm Mode Switch

Press to sequentially scroll between cold alarm, warm alarm, and control temperature.

6.1.1.5 Temperature Increment and Decrement

Press to increase or decrease the temperature.

6.1.1.6 Enter/ Escape

After entering the password, press the key to return to setting mode. After setting, press to return to monitoring mode.

6.1.2 Indicators

6.1.2.1 Operation Indicator

Lights when the freezer is operating.

6.1.2.2 Alarm Indicator

Lights when an alarm is triggered.

6.1.2.3 Temperature Failure Indicator

Lights when the freezer temperature deviates from either upper or lower set limits.

6.1.2.4 Door Open Indicator

Lights when the main door is opened, or is not properly closed.

6.1.2.5 Compressor Protection Indicator

Lights when the compressor has entered into a reduced operating state.

6.1.2.6 Ambient Temperature Indicator

Lights when the ambient temperature has exceeded the upper limit of the recommended operating range.

6.1.2.7 Heat Exhaust Indicator

Lights when the heat exhaust system is not functioning properly.

6.1.2.8 Filter Condition Indicator

Lights when the condenser filter is dirty.

6.1.2.9 Power Failure Indicator

Lights when there is a power failure.

6.1.2.10 Fuse Indicator

Lights when the surge protector on the main electric panel has been damaged due to a power surge.

6.1.2.11 Voltage Failure Indicator

Lights when the incoming line voltage is above or below the voltage regulator operating range.

6.1.2.12 Low Alarm Battery Indicator

Lights when the alarm battery charge is low.

The following indicators are active only when the freezer is equipped with an optional backup system.

6.1.2.13 Backup System Supply Indicator

Lights when the backup system is operating.

6.1.2.14 Backup System Condition Indicator

Lights when the LCO_2 or LN_2 back-up cylinders are empty.

6.1.2.15 Backup System Battery Indicator

Lights when the backup system battery charge is low.

6.2 Merit Series Control Panel

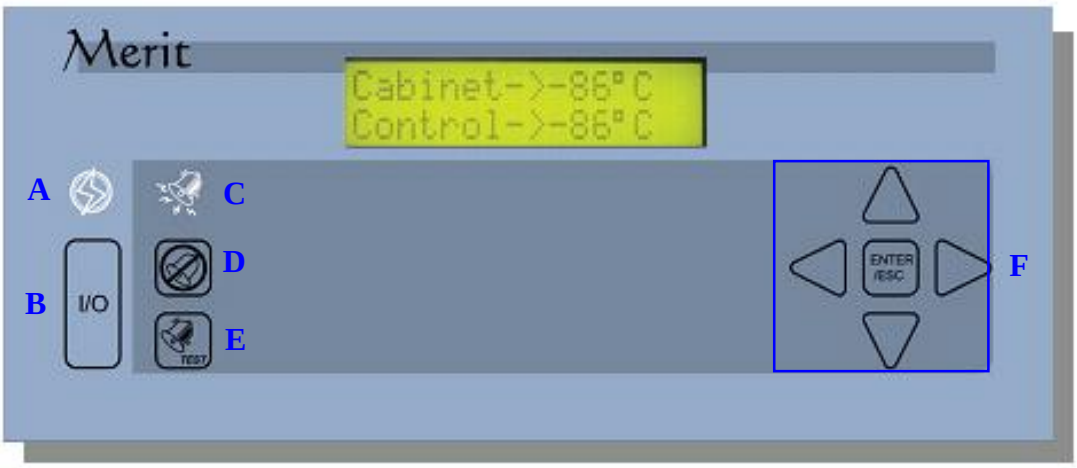
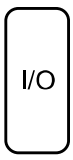


Figure 2. Merit Series Control Panel

A. I/O indicator
B. I/O key
C. Alarm indicator
D. Alarm mute
E. Alarm test
F. Function keys

6.2.1 Control Keys

6.2.1.1 On /Off



. Press to start or to stop the unit. The indicator lights when the freezer is in “On “.
Enter password in the following ssequence △▽◁▷ **(Up, Down, Left, Right).**
The freezer will start. The firmware version will be displayed.

6.2.1.2 Alarm Mute

Press to silence the alarm. The alarm indicator will light. If the failure lasts more than five minutes, the alarm will sound again.

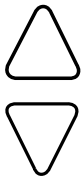
6.2.1.3 Alarm Test

Press to test the alarm. The alarm will sound when pressed.

6.2.1.4 Alarm Mode Switch

Sequentially press to change between cold alarm, warm alarm, and control temperature.

6.2.1.5 Temperature Increment and Decrement



Press to increase or decrease the temperature value.

6.2.1.6 Enter/ Escape

After entering the password, press to return to setting mode.
After setting, press to return to monitoring mode.

6.2.2 Indicators

6.2.2.1 Operation Indicator

Lights when the freezer is operating.

6.2.2.2 Alarm Indicator

Lights when an alarm is triggered.

6.3 Start Up

Refer to Section 6.1 and to Figure 1 for the following procedures

6.3.1 Turning the Power On

1. Connect the freezer to the power outlet. The control panel screen displays lights up.
2. Press I/O, and enter the password (**Sequentially Press**: △▽◁▷). Then press ENTER /ESC. The operation indicator lights up.

6.3.2 Setting the Cabinet Temperature

1. Press ◁▷ until **CONTROL TEMP** shows in the lower screen.
2. Press △ or ▽. A password request appears on the screen.
3. Enter the password (**Sequentially Press** △▽◁▷ : Up, Down, Left, Right), then press ENTER /ESC. The temperature can be increased or decreased by pressing and holding △ or ▽.
4. Press ENTER /ESC to return to the monitoring mode.

6.3.3 Setting the Alarm

1. Press ◁ or ▷ until **WARM ALARM** or **COLD ALARM** is displayed on the bottom of the screen.
2. Press △ or ▽. You are prompted to enter the password.
3. Enter the password (**Sequentially Press** △▽◁▷), then press ENTER /ESC. The temperature can be increased or decreased by pressing and holding △ or ▽.

6.3.4 Alarm Mute

1. When the alarm sounds, press to silence the alarm.
2. If the failure lasts more than five minutes, the alarm will sound again.

6.3.5 Alarm Test

If the warm alarm set point exceeds more than +10°C warmer than the operating temperature set point, we do not suggest you test the alarm as detailed below.

1. Press and hold . The temperature display shows the temperature rising.

   When the temperature reaches the warm alarm set value, the alarm will sound.

Note: The temperature of the refrigerated area does not change. Only the sensor is heated.

2. Release . The sensor and display return to the cabinet temperature within a few minutes.

6.3.6 Remote Alarm Terminal

The terminal for the remote alarm is located on the rear lower right side of the unit. The alarm is outputted from the terminal. Contact capacity is DC 24V, 5A or AC 115V / 230V, 5 / 3.5A. No voltage contact.

-Contact output Used between COM and NO
Normal condition ”Open”
Abnormal condition “Close”
Used between COM and NC
Normal condition “Close”
Abnormal condition “Open”

-RS232/RS485 interface

The unit is quipped with either an RS232 or RS485 interface. For more information about this please contact your distributor.

Note:

The alarm is activated under the following conditions:

1. When the power cord is disconnected from the outlet, or there is a power failure.
2. When the freezer temperature deviates above or below the alarm temperature settings.

Refer to the Appendix (Page 21) for an explanation of the alarm codes.

7. Maintenance

To prevent electric shock and possibly injury, always disconnect the power supply to the unit prior to any repair or maintenance.
Do not to inhale or consume medication or aerosols around the unit during maintenance. This may harmful to your health.

Never touch the condenser when removing the condenser filter for cleaning. Touching of the condenser may result in burns.

7.1 Rechargeable Battery

1. In the event of a power failure, the built-in battery monitors the electronics for a maximum of 72 hours.
2. This battery is recharged automatically when the unit connected to the mains power supply..
3. The battery should be replaced every 2 years as a precautionary measure. This replacement should be carried out by a service technician. The unit must be turned off and unplugged before the battery is removed.
4. The rechargeable battery must be disposed of in the appropriate manner. Do not dispose of the battery with your normal garbage.

7.2 Condenser Maintenance

Clean the condenser at least every six months, but more frequently in dusty environments.

To clean the condenser:

1. Pull open the grill situated on the bottom front right of the compressor housing.
2. Remove the filter and check the fans. If a fan is not operating, contact a service engineer.
3. Vacuum clean the condenser.
4. Replace the filter and close the grill.

7.2.1 Cleaning the Condenser Filter

Clean the condenser filter every two to three months.

1. Pull open the grill situated on bottom front right of the compressor housing.
2. Remove the filter.
3. Shake the filter to loosen dust. Rinse the filter in clean water. Shake the excess water from the filter, and replace the filter.
4. Close the grill.

7.3 Gasket Maintenance

Periodically check the door gaskets for punctures or tears. Leaks are visible as a streak of frost which forms at the point of gasket failure.

7.4 Defrosting

The freezer does not have an auto-defrost function and should be defrosted manually when necessary.

To defrost the freezer:

1. Empty the freezer.
2. Turn off the unit and allow the interior to warm to room temperature. This will

be faster if the door is left open during the warm up process.

3. Allow all ice to melt and remove all the water from the bottom of the cabinet. Dry the interior with a towel.

7.5 Cleaning

1. The freezer should be cleaned and, if necessary, disinfected, before use and at regular intervals afterwards.
2. Use only gentle cleaning agents. Never use aggressive cleaning agents, abrasive detergents, steel wool, abrasive sponges or chemical solvents. When cleaning, make sure that no fluids of any kind run into the ventilator housing.
3. Should there be an odor in the freezer, wash the interior with a solution of baking soda and warm water.

8. Troubleshooting

CAUTION!
Repairs should only be performed by trained personnel.

If the unit malfunctions, check the following before calling for service.

The chamber does not cool:

1. Check the power supply and circuit breaker.
2. The voltage is too low. (Should this be the case, call an electrician.)
3. Check that the power switch is turned ON.
4. The freezer has been loaded with warm (room temperature) inventory. Allow time to cool down.

Poor Cooling:

1. The ambient temperature is too high.
2. The inner doors are not completely closed. The outer door is not closed firmly. (Frost or ice between the cabinet and door gasket could be preventing the door from sealing properly).
3. The air intake grill is blocked.
4. The condenser filter is clogged.
5. The operating temperature set point is not been correctly inputted.
6. The freezer is in direct sunlight, or close to a heat source.
7. The rubber cap and insulation over the access port are not correctly in place.
8. Too many warm items are simultaneously placed in the freezer compartment.

Excessive Noise:

1. The freezer is not installed on a solid floor.
2. The freezer is not level.
3. Something is touching the frame.
4. The freezer is in the immediate post start-up phase.

The unit could sometimes be noisy when the chamber temperature is high. The noise diminishes as the chamber cools. Before initial start up, familiarize yourself with the freezer controls.

9. Appendices

ALARM ERROR CODES

When an alarm condition occurs, an audible signal sounds. The alarm error code will flash in the display. The audible signal can be muted by pressing . The following alarm conditions can occur.

ALARM CODES: PRIME AND MERIT SERIES

Firmware version: 2.43~

CODE	BREAKDOWN DESCRIPTION	SERIES
Code1	Overheating: The alarm sounds when the freezer temperature exceeds the maximum set temperature.	P&M
Code2	Low Temperature: The alarm sounds when the freezer temperature falls below minimum set temperature.	P&M
Code3	The exterior door remains open for 5 min, or, is not closed properly.	P&M
Code4	Power failure.	P&M
Code5	Low battery charge.	P&M
Code6	1 Static pressure switch.	P&M
Code7	2 Static pressure switch: Surpasses one minute.	P&M
Code8	Backup in operation.	P&M
Code9	LCO_2 or LN_2 bottle is empty.	P&M
Code10	Low backup battery power.	P&M
Code11	Faulty T1 temperature sensor.	P&M
Code12	Faulty T2 temperature sensor.	P&M
Code13	Dirty filter.	P&M
Code14	Ambient temperature has exceeded the upper limit.	P&M

POWER CONSUMPTION / HEAT GENERATION

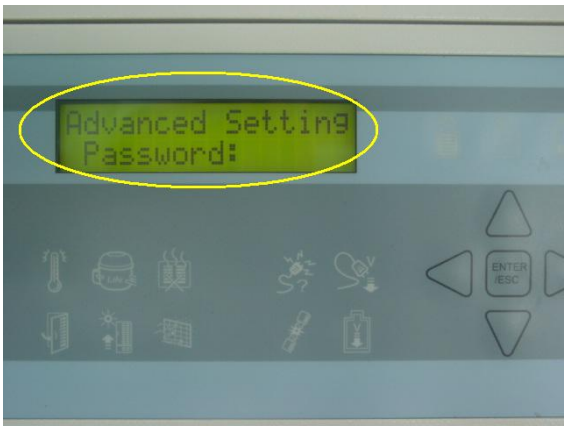
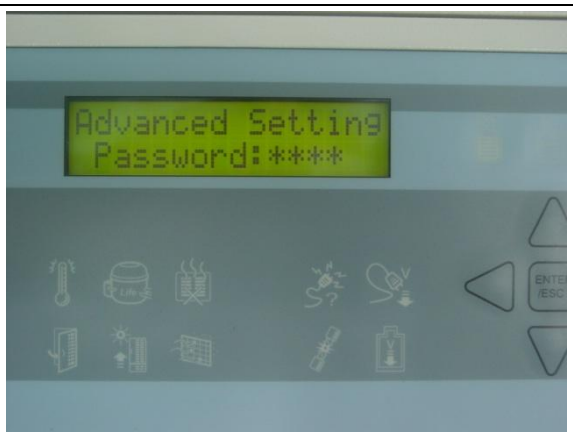
50Hz/60Hz

Ambient	Model	Heat Generated W 30° C→-86° C	Heat Generated W/Hr @-86° C	Power Consumption W 30C→-86° C	Power Consumption W/Hr @-86° C	Power Consumption KW/Month @-86° C
32° C	AV039	7250	608	3470	490	353
	AV050	8700	730	4170	520	374
	AV061	9152	826	4490	690	496
	AV073	10023	910	4540	780	547
25° C	AV039	6524	550	3120	440	317
	AV050	7920	660	3750	470	316
	AV061	8242	689	4040	620	446
	AV073	9060	745	4430	690	496

Ambient	Model	Heat Generated W 30° C→-86° C	Heat Generated W/Hr @-86° C	Power Consumption W 30C→-86° C	Power Consumption W/Hr @-86° C	Power Consumption KW/Month @-86° C
32° C	AA039	4350	320	1105	220	158
	AA050	5220	380	1470	235	169
	AA061	5490	440	1658	310	223
	AA073	6010	470	2200	350	252
25° C	AA039	3910	290	940	198	143
	AA050	4750	340	1240	210	151
	AA061	4950	360	1500	280	201
	AA073	5440	390	1870	310	224

LCO_2 BACK UP SYSTEM

	The freezer must be switched off before connecting the CO_2 cylinder. Connect the CO_2 cylinder to the freezer and open the valve on the cylinder.
	Turn on the back up battery switch, located in the bottom right side of the compressor housing panel. Turn the freezer on by pressing the **I/O** button on the controller.
	Press the **ENTER/ESC** button on the main controller for 10 seconds.

	When the display shows **Alarm Record**, press the **ENTER/ESC** button again for 10 seconds.
	The display shows **Advanced Setting.**
	Enter the password by sequentially pressing the △▽◁▷ keys (Up, Down, Left, Right) to access the Advanced Setting menu.
	Press ◁ or ▷ to access the **Back Up System** menu. Press △ or ▽ to set the back up system to **Enable**.

	Press ◁ or ▷ to access **Back Up Alarm.** Press △ or ▽ and set the back up system alarm to **Enable**. Press **ENTER/ESC** to complete and save the settings.

The backup system will operate when the internal cabinet temperature runs at 5□ lower than the set warm alarm temperature.

BACK UP SYSTEM ALARM CODES

CODE	REASON	SOLUTION
8	Back-up in operation.	
9	Low or empty back up gas level.	Replace gas cylinder
10	Low back up battery power	Replace back up battery

Remember to check the gas levels in the cylinder.